I-5 Widening Project, Salmon Creek to I-205 Noise Study

Frequently Asked Questions

1. Why are noise measurements taken and how do they help us predict future noise levels?

WSDOT predicts future noise levels by using a Federal Highway Administration computer program that simulates, or models, what the configuration of the highway and the conditions of the surrounding neighborhoods will be in the future after the proposed project is built. This computer program considers many factors, including terrain, house rows, the current noise levels at various locations, the number of traffic lanes, how many vehicles use the highway per hour, how fast those vehicles are traveling and what kind of vehicles they are (large trucks, medium trucks or passenger vehicles).

To predict future noise levels, the computer model considers the lay of the land—the hills, valleys, distance from house to highway–and the number of traffic lanes and where they will be located once the project is completed. Potentially impacted houses and other features that vary in terrain, distance, etc, from the project have noise measurements taken at "receptors." The locations of these receptors account for the difference in geography and other factors around the project. If all of the houses are 65 feet from the edge of pavement, the highway is flat and straight and the homes are all at the same elevation, then the noise measurements will be the same for each house, and one measurement and one "receptor" can represent all of the houses.

The actual receptor measurements are then used to calibrate the computer model to ensure that the future, or "modeled," noise levels are accurate. This confirms that the actual noise measurements and the modeled calibrations calculated by the computer are so close that you cannot hear the difference. Using the computer calculations allows a more accurate prediction of future noise levels.

To predict the noisiest traffic possible for a future year (in this case, 2021), we use traffic numbers for the heaviest, or “peak” hour traffic predicted by our traffic engineers for that future year. For this prediction, we also assume this heavy traffic is traveling at the posted speed limit.

2. What time of day and day of the week were the noise measurements taken for the I-5 widening noise study? Why?

According to Federal Highway Administration guidelines, it does not matter exactly what time of day or day of the week noise measurements are taken, as long as it is during a normal day when the traffic count is fairly high, but the traffic speed is also high. Morning and evening rush hour traffic is actually quieter than heavy free flow traffic because the tire noise is reduced as the speed decreases. The time of day when noise measurements are taken also does not affect the outcome of the projected noise levels 20 years into the future.

In general, the exact time of day when noise measurements are taken in any one location are largely random, as long as the traffic conditions mentioned above are met. From this information, WSDOT calibrates the model for accuracy, as mentioned in question number 1 above.

For the most part, noise measurements for the I-5 widening project were taken on Monday, February 12, 2001 at 11 a.m., 11:45 a.m., 1:15 p.m., 2 p.m., 2:20 p.m. and 3 p.m. As required by federal regulation and state policy, measurements were taken for 15 minute time periods during which time the meters record highs and lows in traffic noise levels for an averaged sound level reading.

Measurements were taken on a weekday to better represent standard traffic conditions during the workweek. The day and time provided the most appropriate conditions mentioned above and a good time to gather traffic noise with little interference (dogs barking outdoors, lawn mowers, leaf blowers, other residential outdoor activities).

During these same time periods, WSDOT consultants were able to count traffic more accurately, breaking out the traffic into light duty cars/trucks, medium duty truck (six wheels) and heavy-duty trucks (eight or more wheels). Noise modeling considers the number of truck when evaluating noise since trucks are louder than cars. Anticipated future truck traffic percentages are used to model overall future noise levels.

The measurement location sites, times, dates, and measured noise levels are contained in Table 6 of the Noise Technical Report.

3. How do you determine the number and location of noise receptors? Some places had more receptors than others.

Receptor locations are placed in different areas to ensure that the noise levels experienced in each unique area are represented in the computer model and to ensure that the model accurately reflects the nature of all neighborhoods. Within each neighborhood, homes

may be higher or lower than the highway, or may be at different elevations from each other. They are also at different distances from the freeway.

For instance, if all of the houses are 65 feet from the edge of pavement, at the same elevation, and the highway is flat and straight, then one receptor could represent all these homes since the sound readings would be the same for each house. If another area has some homes at the same elevation as the highway and some homes 10 feet above the highway, two receptors are placed, one to represent each area.

4. Did the noise study analyze noise impacts to the Salmon Creek Elementary School? The school playground is being relocated–was this taken into account?

The noise report did evaluate potential impacts at the elementary school. The receptor for the school site was placed in the existing playground, in the middle of the play set. This location was selected at the suggestion of school personnel, and because it is the highest use area closest to the highway. The future noise level calculated by the computer model at the playground is well below the level that warrants noise reduction action.

The school's renovation project began after all environmental documentation for the I-5 Widening project (including the noise study) had been through public comment and approved by Federal Highway Administration. WSDOT policy does not allow us to consider new development after this documentation process is complete.

5. Did the noise study analyze noise impacts to Klineline Park? Why was the receptor for the park over 700 feet away from the highway?

The noise report did evaluate potential impacts at Klineline Park. The highest use area of Klineline Park is the swimming area at the east end of the lake, which has benches, trash bins and a designated swimming area. This area, when compared to other areas of the park, is designed for a high level of active use and, therefore, was considered the best place for the receptor. The future noise level calculated by the computer model at this location does not warrant noise reduction action.

6. Does the noise study account for the increase in traffic that the project will allow for?

Yes. Noise impacts are evaluated based on the amount of traffic anticipated to occur in the year 2021. This evaluation uses the highest vehicle traffic count, traveling at the posted speed, in order to determine a "worst case scenario" for noise in the future.

7. Is a noise study done in 2001 valid in 2004? How long is the noise data valid?

A noise study is considered valid unless project modifications occur that would change the noise impacts (the alignment of the lanes are changes, more lanes are added, etc.). The original noise study for the I-5 Widening project was completed in 1989 along with other environmental studies. In 2000, when project funding became available, the project design changed to include two more lanes. A new noise study was conducted in 2001 to accurately represent the new design. No project changes have since occurred, we are not required to re-analyze the project.

8. We were told several years ago that a noise wall would be built in our neighborhood. Now you say it won't be built. Why not?

We follow a federal and state process to determine what areas will receive a noise wall. In 1989 (early in this project), the potential environmental impacts and possible efforts to reduce or alleviate them were evaluated in an Environmental Impact Statement (EIS). The noise component of the EIS (the noise study) identified residences expected to have noise impacts in the future, and identified potential locations for noise walls. This evaluation used preliminary project design information, which can change as the project is developed further.

In 2000, a new lane in each direction on the freeway was added to the project design after additional funding became available. Since these new lanes were not considered in the original noise study, the study was conducted in 2001 to accurately reflect the latest project design. In this new evaluation, the ability of some noise walls to meet the minimum noise reduction changed or the wall may have changed in size so that the cost was not allowable under state policy. WSDOT was available to discuss the results of the new noise study and the revised noise wall determinations at public open houses in January 2002 and May 2003.

9. What does "feasibility" mean? I was told that building a noise wall for my neighborhood is not feasible.

According to the state noise policy, the feasibility of a noise wall is based on two elements. One relates to the ability of a wall to provide a reduction in noise, and the other relates to whether the noise wall can actually be built.

For every noise wall determination in Washington, it must be predicted that a noise wall will actually reduce noise sufficiently to justify the use of public funds for its construction. A proposed noise wall is considered feasible if a minimum 7-decibel

reduction can be provided at one residence, and a minimum 5-decibel reduction can be provided at a majority (60%) of the first row of residences along the highway.

A 5-decibel noise reduction is readily perceptible by most people, and a 7-decibel reduction is even more noticeable. We use these criteria because we want to make sure that a proposed noise wall will actually help make the environment quieter.

The second consideration used to determine feasibility is whether a wall can actually be constructed. For instance, certain terrain does not permit us to build a wall over ground with a deep gully or a stream.

Sometimes a noise wall cannot be built without special engineering and construction, such as structural piles or a retaining wall. The cost of this special construction is added to the cost of the wall and these costs could exceed what is allowed under state policy.

10. What are "benefited" residences? There are hundreds of homes in the area, but only the "benefited residences" are counted toward the noise wall.

Any residence that is predicted to receive a 3-decibel noise reduction or greater from a noise wall, is considered "benefited", and will be counted toward the allowed cost of a noise wall. These also include the impacted residents noted in question number 9 above who will receive an even great noise reduction from a wall.

A 3-decibel change in sound is considered by the Federal Highway Administration to be barely perceptible to most people, so a noise reduction of less than 3 decibels would not constitute reasonable use of taxpayer funds.

11. How many "residents" (people) are assumed to be in each residence?

We assume there are three residents in each dwelling unit. This number is based on census data for single-family dwelling units.

12. Why did the Ninety Nine RV Park receive a noise wall when no permanent residents live there? Does WSDOT consider noise walls for commercially zoned businesses?

The Federal Highway Administration noise policy designates which types of properties (residential, commercial, etc.) must be evaluated for noise impacts. These include areas where noise sensitive activities occur such as residences, hotels and motels, parks, RV parks and hospitals.

For land uses where there may be temporary or seasonal use, such as for parks and schools, we makes a determination of how many residential units are represented by the frequency and duration of use. This is called a residential equivalency. An equivalency was calculated for the RV Park and considered in the noise study.

13. Will noise increase on the west side of I-5 due to reflection off the RV Park noise wall?

Noise reflection off this wall would be in the 1-2 decibel range. A 3-decibel increase might be possible if the noise is reflected perfectly. The Federal Highway Administration considers this change barely audible to most people, so any noise increase below 3 decibels should not be noticed. However, as the frequency of the sound may change, the noise may sound slightly different. The amount of reflected noise heard also would depend on the distance of the listener from the wall, the angle of the wall, and other factors.

14. The cost of the noise wall (West Wall 4) is less that 1% of the total project cost. Why can't it be added for the benefit of the impacted neighborhood?

We must apply the federal and state noise policies equitably throughout the state. This means that all areas are evaluated for noise impacts the same way, and that money is allocated for noise walls in the same way.

Many neighborhoods in the state are impacted by noise. If we included money for noise walls in all these neighborhoods, this could take up so much of the highway budget that there would be no money left to build the actual projects that keep our highways safe and moving.

15. Which walls are noise walls, and which are "retaining walls"?

Noise walls are generally the tall concrete walls placed at the edge of the highway pavement, or along the highway right-of-way line next to residential properties. Their sole purpose is to reduce highway noise, and are "free standing" walls.

Retaining walls are built to hold back earth, and are often seen at the edge of the highway with a slope directly behind it. Retaining walls also are used to contain materials that form a foundation when the highway is built above the surrounding terrain. Usually retaining walls are placed to hold back slopes or avoid building slopes that might extend out from the freeway, impacting property or streams.

16. Truck "jake" brakes wake us up at night. What else can be done to lessen this noise?

State law does not prohibit the use of truck exhaust, or "jake" brakes, only the use of un-muffled exhaust brakes. Some local agencies restrict the use of "jake" brakes in certain areas. These areas are delineated with signs posted by local agencies, but the state itself cannot enforce these prohibitions on state highways.

17. How do highway noise policies vary from local county and state noise ordinances?

State and federal highway noise regulations and policies establish requirements for reducing vehicle noise impacts in the construction of highway projects. Local noise ordinances are written to protect the public from many types of environmental noise such as barking dogs, music, construction noise etc. Local ordinances especially restrict nighttime noise. Noise from vehicles traveling on roads and highways are exempt from local ordinances.

18. Vegetation has been removed from the edge of the highway during construction. It seems much louder now. Will this vegetation be replaced?

Removing vegetation on the edge of the highway rarely results in an increase in noise at nearby residences. It is more often the case that removing vegetation allows people to actually see the vehicles, which can contribute to a sense of intrusion. Studies have shown that a grove of heavily vegetated forest (trees and shrubs, both deciduous and evergreen) 100 feet wide is necessary to reduce noise by about 5 decibels.

We will plant slope-stabilizing grasses and a limited number of trees and shrubs in various locations along areas of the highway that required vegetation removal. We will also construct a berm of various heights along the east side of the highway at NE 18th Avenue. The berm will be made from surplus material that is not suitable for highway construction, but works well for plantings.

19. Can residents pay the difference for a noise wall that doesn't meet the cost/benefit reasonableness criteria?

No. State government cannot "partner" with private citizens to pay for noise walls. Even if the cost of the wall goes from "not reasonable" to "reasonable" with a public contribution, the state cannot accept such a donation. The state must always be equitable in applying its policy. It would not be fair to allow one neighborhood to contribute to a

wall to make it reasonable, if other neighborhoods were not able to contribute in the same way.

However, a neighborhood can pay for a noise wall in full if the location of the wall does not prevent us from realizing any future highway plans, or does not cause a safety problem. Any wall constructed on state right-of-way must meet all federal and state noise policy requirements and state design guidelines. It would be negotiated with the neighborhood group to make sure that design and safety requirements would be met. If a neighborhood wishes to construct a wall that does not meet the reasonable or feasible criteria, the wall will not be recognized as "noise abatement" under our program.

LEARNING MORE & STAYING IN TOUCH

- **WSDOT Web Site**
  Information on traffic impacts will be updated weekly and construction status will updated as often as needed: **http://www.wsdot.wa.gov/projects/I5SalmonCreektoi205/**

- **Targeted Area Mailings and Salmon Creek Elementary School Student Notices**
  At major project milestones and in advance of significant traffic impacts

- **Variable Message Signs**
  Advance notice of traffic impacts or traffic flow changes, allowing time to seek alternate routes

- **E-mail to WSDOT Project Staff**
  Send questions or concerns to: swl-5widening@wsdot.wa.gov

- **WSDOT's Vancouver Area Engineering Office — 360-905-1500**
  Talk with project staff directly (Monday-Friday, 7:30 a.m. to 5 p.m.)